**I don't like spinach and I'm glad I don't,
because if I liked it I'd eat it, and I just hate it.**
Clarence Darrow, *Quotations Digest*

Playing with Pesticides

Recent anecdotal reports of headaches, dizziness, muscle twitching, vomiting, blurred vision, and other health effects associated with excessive exposure to chlorpyrifos have caused the EPA and industry to implement measures to protect consumers from overexposure to the pesticide. However, a new study shows that using chlorpyrifos products even in a manner consistent with the manufacturer's instructions can lead to exposures well above the level considered safe by the EPA. In addition, the study suggests that children run a particularly high risk for dangerous chlorpyrifos exposure.

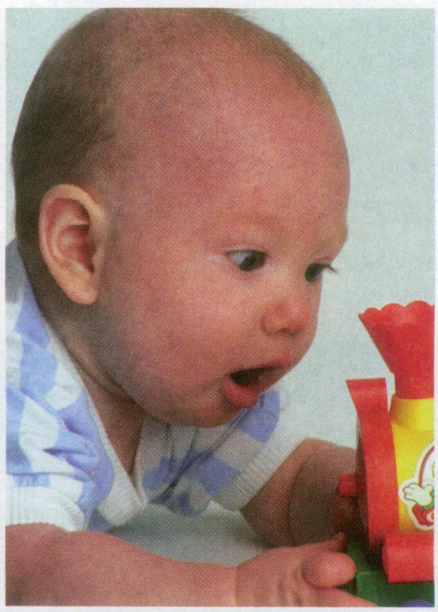
Chlorpyrifos is a broad-spectrum organophosphate insecticide that has risen in popularity as the use of other pesticides, such as aldrin, dieldrin, and chlordane, has been phased out. Sold under the brand names Dursban and Lorsban (both manufactured by DowElanco of Indianapolis, Indiana), it is currently one of the most widely used pesticides in the United States in both household and professional applications.

It is in household applications that potentially hazardous exposures may occur, say scientists from the Environmental and Occupational Health Sciences Institute of Rutgers University in Piscataway, New Jersey, who authored the new study. The study, published in this issue of *EHP*, investigates the level of chlorpyrifos that adheres to surfaces and objects in a room after it has been treated with the pesticide and ventilated according to the manufacturer's instructions. The authors propose that the semi-volatility of the pesticide allows it to continue to be deposited on surfaces in a treated room weeks after application; it may adhere to objects that are brought into the room hours or days after the pesticide is applied, such as children's toys.

To test this proposal, the authors treated rooms in two apartments with Dursban and then opened windows and used fans to ventilate the rooms for the recommended four hours. After a fifth hour, they placed groups of plastic and plush toys in the rooms, and periodically thereafter removed one plastic toy and one plush toy to measure surface chlorpyrifos contamination. What they found was that significant amounts of chlorpyrifos were volatilizing from other surfaces and adhering to the toys long after the pesticide was applied; in fact, peak deposits on surfaces in the room took place 36 hours after the original application.

The authors conclude that applications of chlorpyrifos could result in significant doses of the pesticide to children who play in recently treated rooms. For a child between the ages of three and six, the total nondietary dose of chlorpyrifos after normal home treatment was calculated by the authors to be about 208 micrograms per kilogram of body weight per day (μg/kg/day)—well above the EPA's reference dose for chlorpyrifos of 3 μg/kg/day (the daily dose that is unlikely to cause any harm over a lifetime). For children who exhibit high levels of hand-to-mouth activity, the authors conclude that this dose could be as high as 634 μg/kg/day. The study also demonstrates that dermal and oral exposure to the pesticide via toys and other surfaces may present a greater risk to children than inhalation of chlorpyrifos.

This study is likely to shed doubt on whether a June 1997 agreement between the EPA and industry to reduce consumer exposure to the pesticide will be sufficient to protect children. That agreement calls for the elimination of chlorpyrifos in pet products such as flea dips and shampoos and in broadcast pesticide products such as foggers. The agreement also commits chlorpyrifos manufacturers to take steps to ensure that the pesticide is not applied on inappropriate surfaces such as toys, drapes, and furniture. New warning labels, based on the agreement, should begin appearing on chlorpyrifos products sometime this year.



Toxic toys? A new study suggests children may be at risk of consuming dangerous amounts of chlorpyrifos from the surfaces of toys.

However, the new study suggests that even when the greatest care is taken to ensure that the pesticide is applied only to surfaces that children are unlikely to contact, there is still the chance that it will end up on other, absorbent surfaces such as toys and pillows. Though the treatment used in the study apartments was a broadcast application of chlorpyrifos, which industry and the EPA have already agreed to phase out, the research indicates that more care must be taken than previously thought to avoid exposures to this pesticide. It also signals that regulators can no longer simply measure air concentration to determine if dangerous levels of certain pesticides exist in a room.

Not Enough Spinach?

Children in the United States generally do not eat as much of some food groups as the U.S. Department of Agriculture (USDA) recommends, and many children do not meet USDA recommendations for any of the five food groups, according to a recent study published in the September 1997 issue of the journal *Pediatrics*. Researchers at the division of cancer prevention of the National Cancer Institute compared the USDA's *1989–1991 Continuing Survey of Food Intakes by Individuals* to the recommendations contained in the USDA's 1992 *Food Guide Pyramid*. They found that only 1% of children in the survey met all recommendations, but that these children also tended to consume too much fat. Overall, about 30% of children were found to meet recommended dietary allowances (RDAs) for fruit, grain, meat, and dairy, while about 36% met the RDA for vegetables. Over 45% of the children surveyed met none or only one of the recommendations.

The USDA recommends that children eat 6–11 servings of grain per day, 3–5 servings of vegetables, 2–4 servings of fruit, 2–3 servings of dairy products, and 5–7 ounces of meat. In contrast, the study found that children are eating on average only 5.8 servings of grain, 2.6 servings of vegetables, 1.3 servings of fruit, 2.1 servings of dairy products, and 3.9 ounces of meat. The weight of food